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Managing Wildland Fire: Enhancing Capacity to Implement the Federal Interagency Policy

Phase II Report
Study of the Implementation of the Federal Wildland Fire Management Policy

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HAZARDS U.S.

Through agreements with FEMA, the National Institute of Building Sciences developed a standardized, nationally applicable earthquake loss estimation methodology. This approach uses GIS tools and geo-referenced data in a customized software product called HAZARDS U.S. (HAZUS). Risks are portrayed graphically on maps and quantitatively through tables that are directly related to the maps. This project was established in 1992, and the first version of HAZUS was released in 1997, when it became available nationwide to FEMA's earthquake program. Version 2 followed in 1999. Version 3 will be available in December 2002 for use in FEMA's flood, hurricane, and earthquake programs. Version 3 also will incorporate new demographic data from the 2000 Census and significant software refinements.[103] HAZUS can be modified to address additional types of hazards, and FEMA expects it eventually to become an all-hazards tool.

By using this software, officials at various government levels—primarily state and local—can plan mitigation efforts, prepare for emergency response, and plan for recovery and restoration.[104] HAZUS generates several types of user-specified maps. They include (1) ground shaking and permanent ground displacement (for earthquakes) and (2) inundation areas, flood characteristics, and recurrence intervals (for floods), and (3) wind-driven storm loss potentials (for hurricanes). It also can display information from several sources, such as population density, essential facilities, high-potential loss facilities, and hazardous material sites. HAZUS also generates several types of user-specified reports, including (1) building, utilities, and emergency facilities inventories, (2) building damage estimates, (3) direct and indirect losses, and (4) expected casualties.

The HAZUS software's detailed maps and tabular analytical reports describe a community's potential losses from earthquakes and hurricanes at the Census tract level, and from floods at the Census block level. The loss estimate includes the damage and economic loss to buildings and infrastructures, as well as casualties, shelter requirements, and indirect economic loss. Through the reports and maps generated by HAZUS, users can (1) anticipate the possible nature and scope of disaster-related damages and losses based on alternative scenarios, (2) identify vulnerable areas that may require special land use provisions or building codes, (3) assess the vulnerability of buildings and facilities, (4) assess the vulnerability of people and allow for response planning and recovery activities, (5) assess potential direct and indirect economic effects and allow for recovery planning, and (6) facilitate disaster-related planning with potentially affected stakeholders. HAZUS also can be used to quickly estimate losses following an event.

To ensure that the necessary individuals have access to this software, HAZUS has been sent to more than 1,300 users (about equally divided between the public and private sectors). All of FEMA's Project Impact communities have been sent a copy

[103] To date, HAZUS has cost $18,570,000. By the time HAZUS version 3 is released (which will be capable of addressing earthquake, hurricane, and flood hazards) it is estimated that the total program will have cost $29,500,000.

[104] More officials are expected to use the Version 3 flood and hurricane estimation capabilities than the one for earthquakes. This is because earthquakes are a less frequent and more localized phenomenon than floods and hurricanes, which occur annually in many different parts of the country.

and some, especially in California, are known to be using it. Recognizing that state officials, in particular, need to understand how to use HAZUS, FEMA and the National Institute of Building Sciences have trained emergency managers from all 50 states and the U.S. territories.

HAZUS does not yet incorporate wildland fire hazards. However, there is potential for integrating the current fire models into it to create a more complete package especially suited to addressing the wildland-urban interface. This package would provide a comprehensive and easy-to-use risk management mechanism that could predict the likelihood and magnitude of fires, model fire behavior and effects, quantify risks, estimate potential losses, and calculate ecological rehabilitation needs. None of the current fire models can generate this kind of integrated information. These tools could be made available nationwide to (1) federal fire and resource managers, (2) state, local, and tribal governments, and (3) the private sector.

Box 5-1 outlines the process for integrating these models. The cost of developing and distributing an integrated package should be relatively modest because it would take advantage of the considerable investments that have already been made in the existing fire and HAZUS models. Applying the integrated model in the wildland-urban interface can be expected to be eased by the widespread availability of HAZUS, the personnel who are already trained to use it, and the existing field support for it.

Box 5-1. Process for Integrating Wildland Fire Models

HAZUS could be applied to wildland fire by adding a few specialized modules to the basic model. This has been done for hurricanes and floods. One complication in developing this mechanism is that fire behavior is more complex than other types of disasters. Yet, scientists at the Forest Service's Missoula (Montana) Fire Sciences Lab and elsewhere have done a great deal of work that could be integrated with HAZUS. Although this process would require some time and additional funding, it would benefit greatly from the investments already made in the basic model.

The integration process could begin with a fire risk workshop that brings together (1) scientists and database experts, (2) fire modelers from Missoula, MT and elsewhere, (3) HAZUS developers, (4) local, tribal, and state land use planners, and (5) fire managers and other model users. The purpose of the workshop would be to determine the overall needs and the availability of data resources. To integrate fire models with HAZUS, fire managers would need to: (1) assess the state of the art in wildland fire modeling, analysis, visual display, and estimation methodology, (2) develop the methodology to be used to integrate those models with HAZUS, (3) determine applicable data availability and needs, (4) develop the software with user input, (5) conduct pilot studies to validate the methodology and the software, (6) make revisions based on the feedback from the validation process, (7) release the software, and (8) provide technical support to its users.

Overall, the process for adding a fire component to HAZUS would be similar to the one for earthquakes, floods, and wind. To develop the current and updated versions of HAZUS, project managers would need to identify key tasks and write a work plan, let subcontracts, monitor the development and testing of software, facilitate committee reviews and approvals, monitor budgets and payments, write reports, and organize user conferences and workshops.